

PROCESSING OPERATIONS CONTROL OMI PLANNING SHEET



Wad Number S6444-J03-R01	SITE PAD-B FR	Elem CD V	End Item 104 FLT: 025	DATE: 03/15/2002 TIME: 10:13:47
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Title: SSV ICE AND DEBRIS ASSESSMENT	Sub Element/Zone 30
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Project Work Order No.	Hazard: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	SFOC Safety N/A	WC 150 USA MAR 18 '02	<input type="checkbox"/> Local Copy <input checked="" type="checkbox"/> Firing Room Copy
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Authorizing Document ORB425-491(ADD)	Material & Equipment: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	MICR Req'd <input type="checkbox"/> Yes <input type="checkbox"/> No	OMRS: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
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PERFORM THE FOLLOWING:

<u>Pre-Ops Setups</u>							
Task	Operation Number	Seq	Steps	Task	Operation Number	Seq	Steps

<u>OPS Support</u>							
Task	Operation Number	Seq	Steps	Task	Operation Number	Seq	Steps

<u>Operating Instructions</u>					
Task	Seq	Steps	Task	Seq	Steps
	150				

<u>Post Ops</u>			
Task	Operation Number	Seq	Steps

<u>Appendices</u>	
Task	Seq

Subtask WAD's



OMI TASK CLOSEOUT CHECKLIST

OMI No. <i>56444 J-03</i>	Run No. <i>1</i>	Task Control No. (TCN) <i>2965289</i>
Start Date <i>3/27/02</i>	Completion Date <i>4/27/02</i>	Closure Date <i>MAY 22 '02</i> 
		QC/Eng. Date
1. Deviation Index: Verify total number of deviations agree with index. Verify entry is correct into OMI.		  <i>MAY 22 '02</i>
2. Constraints List: Verify all constraints are accepted by QC or waived by Engineering. Verify that constraints list is complete and closed. <i>SUBTASK S0007 NO DIR Required</i>  <i>MAY 22 '02</i>		<i>N/A</i> <i>MAY 22 '02</i>
3. IPR's: Verify that all IPR's are closed or upgraded to problem reports or dispositioned as no constraint to OMI closure and incorporated in central IPR system and a copy of the central IPR sort attached.		 <i>N/A</i> <i>MAY 22 '02</i>
4. Verify that material and equipment requirement list enclosed (if applicable).		<i>N/A</i> <i>N/A</i>
5. OMI: Verify that all pages or verification sheets are completed, stamped, and dated in the lower left/right hand corners.		 <i>MAY 22 '02</i>
6. OMI: Verify that all miscellaneous documents/procedures have sequence number referenced and stamped; e.g., photos, sample results, etc.		<i>N/A</i> <i>N/A</i>
7. Planned task/OMI satisfactorily completed. OPR: <i>R Brewer</i>		 <i>MAY 22 '02</i>

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SSV ICE AND DEBRIS ASSESSMENT

Element/End Item: ALL
Flow/Usage: ET-103 & SUBS
Facility: LC 39
Design Center Concurrence: MSFC/JSC
Category: B
OPR: ETM
TTL ORG: SE

This document contains
HAZARDOUS operations.

Table of Contents:

1.0 INFORMATION.....	1
1.1 Objective.....	1
1.2 Special Instructions All Operations.....	2
1.3 Operations List	4
2.0 SAFETY INFORMATION.....	5
2.1 Hazards	5
2.2 Safety Requirements.....	5
2.4 Reference Safety Documentation	5
3.0 STAGING REQUIREMENTS	6
3.1 Referenced Engineering Documentation.....	6
3.1.2 Documents.....	6
3.2 Parts, Materials, Equipment, and Special Tools.....	6
3.2.5 Shop Support Materials	6
3.2.8 Personal Protective Equipment	7
4.0 PLANNING REQUIREMENTS	8
4.3 LPS Requirements	8
4.3.1 Computer Systems.....	8
4.4 Support Services, Commodities, and Equipment.....	8
4.4.2 Communications.....	8
4.4.3 OTV.....	8
4.4.4 Countdown Display/Status.....	9
4.4.8 Services	9
4.4.12 Propellants, Gases and Chemicals.....	9
5.0 CONFIGURATION ACCOUNTING AND VERIFICATION	10
5.1 Specific OMRS Requirements Satisfied by this TOP	10
5.5 List of References	11

1.0 INFORMATION

1.1 Objective

Provide necessary tasks that document, monitor and evaluate ice and debris conditions to eliminate or minimize debris concerns of the integrated SSV during ET tanking, FRF, launch, and associated detanking.

Description

1. This OMI is performed as subtask to S0007/S0014/S0037.
2. This OMI provides documentation of ice/debris activities:
 - A. Pre-launch icing briefing
 - B. Pre-launch debris inspection
 - C. Countdown - Based timeline evaluation monitoring of ET TPS surfaces using OTV
 - D. OTV monitoring of seal/flange areas for cryogenic leakage
 - E. SSV OTV monitoring for debris conditions during countdown
 - F. Cryogenic replenish inspection for evaluation of SSV and facility debris concerns or anomalies
 - G. Evaluation of concerns/anomalies in the event of ET detanking
 - H. Review of engineering film data for SSME ignition, launch, ascent, ET separation, and orbiter landing.
3. Orbiter landing debris information is contained in the NASA publication for Ice and Debris Assessment. That report is referenced in this OMI for continuity of debris data.

1.2 Special Instructions All Operations

1. This OMI is run as a subtask to OMI's S0007, S0014, and S0037. All PAD clearing and controlled access operations will be performed per those OMI's.
2. Constraints will be statused by controlling OMI's S0007/S0014/S0037.
3. The OTV camera numbering scheme for PAD A/B is OXX/1XX.
4. Task Team Leader assignment: NASA PH-H is TTL for L-20 Hour Walkdown, Final Inspection, and Post Launch/Drain Walkdown. ETM is TTL for all other operations.
5. From time stable replenish mode starts until start of final SCAN, scanning with individual cameras should be performed approximately once per hour.
6. Cameras 061/161, 063/163, and 070/170 may be released to NASA select with CICE concurrence.
7. All personnel participating in final inspection and post drain walkdown shall be current in following training:
 - A. Emergency PAD egress
 - B. Fire fighting
 - C. ELSA
8. Milestones:
 - A. MLP portion of post launch walkdown commences at approximately T + 1 hours.
 - B. PAD acreage portion of the post launch walkdown commences at approximately T + 2 hours. (may be deferred until preferred daylight hours.)
 - C. Post drain walkdown commences at approximately T + 4 hours after drain initiated (typically 1 1/2 hours after LH₂/LO₂ low level sensors dry).
9. Hands-on investigation required for all ET-TPS defects suspected of violating NSTS 08303 ice/debris inspection criteria.
10. From time launch scrub is declared until 1.5 hours past time LH₂/LO₂ low level sensors read dry, OTV camera scanning shall be performed approximately once per hour.

11. OTV cameras 004/104, 009/109, 013/113, 033/133, 042/142, 054/154, 055/155, 056/156, 060/160, 061/161, 062/162, 063/163, 064/164, 065/165, 066/166, 067/167, 068/168, 069/169, 070/170, and 071/171 shall be used to monitor LO₂/LH₂ tank drain operations.
12. Excessive vapors are defined as being more severe than that described in NSTS 08303 - Ice/Debris Inspection Criteria or NSTS 16007 - Launch Commit Criteria - Hazardous Gas Subsystem.
13. Quality coverage is not required for performance of this OMI. Ref SFOC-GO0007, Ice and Debris Team Operations are exempt from quality coverage. The ROR (CTIF) performs the CMQC function for all non-hazardous operations.
14. Personnel using Sony DKC-ID1 camera shall verify lithium ion battery is securely locked in the bayonet fitting and the lithium button battery door is securely locked and taped in place.
15. Verify camera flash is deactivated.
16. Personnel using Kodak DC 50/120 camera shall verify alkaline batteries are properly installed.
17. Personnel using digital cameras shall not operate in H₂ leak or O₂ rich environment (23 percent or greater).
18. Personnel using the Sony MVC-FD91 camera shall verify the lithium ion battery is securely locked and the battery door is locked closed. Personnel shall verify that both battery doors (lithium ion and lithium button) are closed and taped shut.
19. Personnel shall verify that cameras and equipment are securely tethered when at the PAD while the SSV is present.

1.3 Operations List

Operation		Shop/ Cntl Rm Console	OPR	Haz (Y/N)	Duration (Hrs)
No.	Title				
10	Support Preparations	STM/ FR2	ETM	N	0.2
15	IR Camera Setup	PH-H/ NA	ETM	N	4.0
20	Ice Prediction Briefing	SE/ NA	ETM	N	0.5
30	Pre-launch Walkdown	SE/ NA	ETM	N	2.0
40	Ice Frost Debris Console Initial Configuration Setup	SE/ FR2	ETM	N	3.0
50	SSV Debris Assessment	SE/ FR2	ETM	N	18.0
60	Group 1 Monitoring LO2 Chill Down Thru T-0	SE/ FR2	ETM	N	15.0
70	Group 2 Monitoring - LH2 Chill Down Thru T-0	SE/ FR2	ETM	N	15.0
80	Final Inspection	SE/ FR2	ETM	Y	3.0
90	LO2/LH2 Drain Monitoring	SE/ FR2	ETM	N	4.0
100	Console Securing	SE/ FR2	ETM	N	0.5
110	Summary Tape	SE/ FR2	ETM	N	18.0
120	Post Drain Walkdown	SE/ NA	ETM	Y	2.0
130	Post Launch Walkdown	SE/ NA	ETM	Y	3.0
140	Film Review	SE/ NA	ETM	N	15.0
145	IR Camera Removal	PH-H/ NA	ETM	N	2.0
150	Final Report	SE/ NA	ETM	N	0.5

2.0 SAFETY INFORMATION

2.1 Hazards

Operation

1. Working at unprotected heights.
2. Walkdown at PAD while SSV is in stable replenish mode.

2.2 Safety Requirements

Operation

1. If lightning activity is forecast to be within 5 miles of launch PAD, CTC and SFOC safety shall implement provisions of adverse/severe weather and lightning policy contained in GSOP 5400 Ground Safety Operations Procedures.
2. There are no safing/shutdown or evacuation steps required in this OMI.
3. Hazardous operations within this subtask OMI will not be started until safety concurrence to proceed has been given per the integrated OMI controlling this subtask.

2.4 Reference Safety Documentation

Number	Rev	Title
KHB 1710.2	LI	KSC Safety Practices Handbook
GSOP 5400	LI	Ground Safety Operating Procedures

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3.0 STAGING REQUIREMENTS

3.1 Referenced Engineering Documentation

3.1.2 Documents

OPERATION 120

Document No.	Rev	Title
NSTS 08303	(LI)	NSTS PROGRAM ICE/DEBRIS INSPECTION CRITERIA

3.2 Parts, Materials, Equipment, and Special Tools

3.2.5 Shop Support Materials

OPERATION 15

Part No./Find No.	Nomenclature	Qty	Unit
8305-00-519-3144	Rymple cloth	2	roll
6810-00-543-7915	Isopropyl alcohol	8	ounces

OPERATION 145

Part No./Find No.	Nomenclature	Qty	Unit
8305-00-519-3144	Rymple cloth	2	roll
6810-00-543-7915	Isopropyl alcohol	8	ounces
6505-00-133-8025	Petroleum Jelly, Vaseline (or equivalent)	1	tube/jar

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3.2.8 Personal Protective Equipment

- OPERATION 15** **Nomenclature**
N-Dex nitril gloves
chemical splash goggles
face shield
- OPERATION 30** **Nomenclature**
safety harness
lanyard
- OPERATION 80** **Nomenclature**
safety harness
lanyard
Nomex coveralls with gloves and hoods
ELSA
- OPERATION 120** **Nomenclature**
safety harness
lanyard
hardhats
flame retardant coveralls
- OPERATION 130** **Nomenclature**
safety harness
lanyard
hardhats
flame retardant coveralls
- OPERATION 145** **Nomenclature**
N-Dex nitril gloves
chemical splash goggles
face shield

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4.0 PLANNING REQUIREMENTS

OIR Required Yes [], No [X]

4.3 LPS Requirements

4.3.1 Computer Systems

PC GOAL
CCMS Configuration
CDS
CMS

4.4 Support Services, Commodities, and Equipment

4.4.2 Communications

(Per controlling OMI S0007, S0014 or S0037 unless specified otherwise)

4.4.3 OTV

(Per controlling OMI S0007, S0014 or S0037 unless specified otherwise)

OTV Cameras required: 004/104, 009/109, 013/113, 033/133, 042/142, 054/154, 055/155, 056/156, 060/160, 061/161, 062/162, 063/163, 064/164, 065/165, 066/166, 067/167, 068/168, 069/169, 070/170, and 071/171

OTV Cameras to be recorded: 004/104, 009/109, 013/113, 033/133, 042/142, 054/154, 055/155, 056/156, 060/160, 061/161, 062/162, 063/163, 064/164, 065/165, 066/166, 067/167, 068/168, 069/169, 070/170, and 071/171

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4.4.4 Countdown Display/Status

<u>Display Required</u>	<u>Bldg</u>	<u>Room</u>	<u>Operation Time</u>
Timing	LCC	FR2	Duration of Test
Countdown and GMT	LCC	FR2	Duration of Test

4.4.8 Services

<u>Service/Special Requirements</u>	<u>Location</u>	<u>Purpose</u>
SFOC Safety	LC-39 A&B	Safety Support
ELSA'S (8)	LC-39 A&B	Inspection Team Use
Radio Net 105	LC-39 A&B	Inspection Team Use

4.4.12 Propellants, Gases and Chemicals

<u>Commodity</u>	<u>Spec No.</u>	<u>Quantity</u>	<u>Revr</u>	<u>Location</u>	<u>Minimum Press</u>	<u>Delivery Time</u>
GN ₂	SES-0073 -6.3-5	Min 750 Cu ft	PH-H 861-3645	Pad 39B Camera Site 2	3000 PSI	1 week prior to T-0

5.0 CONFIGURATION ACCOUNTING AND VERIFICATION

5.1 Specific OMRS Requirements Satisfied by this TOP

OMRS NO.	NOMENCLATURE/ EFFECTIVITY	SEQ-STEP (CAP)
S00E00.021	ET TPS MON DURING DETANK TAF;C	90-005
S00E00.031	POST DETANK ET TPS INSPECT TAF;C	120-002
S00FA0.900	PRELAUNCH WEATHER BRIEFING (L-1 DAY) VAF1-90	20-001
S00FB0.005 (1)	ET TPS SURFACE MONITORING T23,27-29,31-999	50-023
S00FB0.350 (1)	MONITOR GO2 VENT HOOD VAF1-90	50-025
S00FB0.360 (1)	MONITOR ET/ORB MPS FOR LEAKAGE VAF1-90	50-023
S00L00.150	HIGH WIND ET NOSE INSPECTION SAF;C	50-021
S00U00.010 (1)	POST LAUNCH SHUTTLE/PAD AREA INSPECTION SAF1-999	130-002
S00U00.011 (1)	ENGR REVIEW & ANALYSIS OF LAUNCH FILM SAF1-999	140-001
S00U00.020-A (1)	AN ENGINEERING PAD INSPECTION TEAM SAF1-999	80-002
S00U00.020-C (1)	INSPECT ORBITER AFT ENGINE SAF1-999	80-002
S00U00.020-D (1)	INFRARED SURVEILLANCE SAF1-999	80-002
S00U00.030 (1)	PRELAUNCH SHUTTLE/PAD AREA INSPECTION SAF1-999	30-001

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5.5 List of References

OPERATION 20

Reference No.	Rev	Title
NSTS 16007	(LI)	NSTS Program Launch Commit Criteria - Hazardous Gas Subsystem and Appendix F

OPERATION 30

Reference No.	Rev	Title
80901019010	(LI)	ET Post Build Acceptance and In-Process Rework Requirements Manual - Offsite

OPERATION 40

Reference No.	Rev	Title
79K24576	(LI)	OTV System Installation, LC 39, Pad A
79K24522	(LI)	OTV System Installation, LC 39, Pad B

OPERATION 50

Reference No.	Rev	Title
SPI SP-519	(LI)	OMI and OM Implementation
SFOC GO0007	(LI)	Quality Planning Requirements Document (QPRD)

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OPERATION 10 Support Preparations

Shop: STM
Cntrl Rm Console: FR2
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 0.2

10-1 STM JYVO 138

Verify PAD OTV system is configured to support S6444 as scheduled.

Support: COMM

10-2 STM JSTC 111
 JSTC *SCB 114

Verify eight 10-minute ELSA's available at complex J for use by Final Inspection Team (ref S0007/S0014/S0037).

Support: LS

10-3 STM TBC 136

Operation - Support Preparations complete.

*** End of Operation 10 ***

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OPERATION 15 IR Camera Setup

Shop: PH-H
Cntrl Rm Console: NA
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 4.0

WARNING

Hard hats required on the Pad when SSV is not present.

CAUTION

Exercise care to avoid dropping equipment, fasteners, etc from RSS Roof to prevent damage to equipment or injury to personnel. All tools must be tethered.

NOTE

IR Camera installation at RSS Roof site may be not performed if IR Camera already installed or if technical concerns preclude such.

15-1 **Install IR camera at RSS Roof Site as follows.**

- 1.** **Rotate camera housing back cover to open position by removing bolts with flat washers (20 pl). Retain bolts/washers for reinstallation.**
- 2.** **Remove camera housing front cover by removing fasteners (2 pl). Reinstall fasteners after cover removal. Retain cover for reinstallation after IR Camera Unit removal.**
- 3.** **Install IR Camera Unit into camera housing. Secure IR Camera Unit in housing by locking spring pin at lower, left.**

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WARNING

Power cable is live. Care should be exercised when connecting power cable to avoid electric shock.

CAUTION

Do NOT allow opened back cover to exert undue force on cables once cables have been connected.

4. **Connect:**
 - OTV coaxial cable
 - Pan & tilt cable
 - Controller cable
 - Power cable

5. **Rotate camera housing back cover into closed position. Secure back cover by installing bolts/flat washers (20 pl). Tighten bolts wrench tight.**



NOTE

IR Camera installation at Camera Site 2 may be not performed if IR Camera already installed or if technical concerns preclude such.

15-2 Install IR camera at Camera Site 2 as follows.

1. **Rotate** camera housing back cover to open position by removing eight ea bolts using Phillips screwdriver. **Retain** bolts/washers for reinstallation.
2. **Remove** camera housing front cover by removing securing bolt(s). **Reinstall** bolt(s) after cover removal. **Retain** cover for reinstallation after IR Camera Unit removal.
3. **Install** IR Camera Unit into camera housing. **Secure** IR Camera Unit in housing by tightening set screw(s) wrench tight at lower left/right.

WARNING

Power cable is live. Care should be exercised when connecting power cable to avoid electric shock.

4. **Connect:**
 - OTV coaxial cable
 - Pan & tilt cable
 - Controller cable (2 pl)
 - Power cable
5. **Rotate** camera housing back cover into closed position. **Secure** back cover by installing bolts (8 pl). **Tighten** bolts using Phillips screwdriver.

WARNING

Isopropyl Alcohol is flammable and is a skin, eye and respiratory tract irritant that affects the central nervous system. Ensure adequate ventilation, avoid inhalation of vapors and do not use near heat, sparks or open flame. Skin contact may cause redness and pain eye contact will cause severe eye irritation and may result in permanent damage. Inhalation of vapors in high concentrations has a narcotic effect on the central nervous system. Personnel shall wear N-Dex nitril gloves and chemical splash goggles. When working at eye level or above wear a face shield over goggles.

WS002 a 05-22-01

6. **Clean** IR Camera Unit lens plate using (1) roll 8305-00-519-3144 Rymple cloth dampened with (4) ounces 6810-00-543-7915 Isopropyl alcohol .
7. **Perform** functional checkout of IR Camera Unit using local controller if required at Task Team Leader (TTL) discretion.

Sub Step Not Performed: N/A

NASA PH-H  Date 3/27/02
USA ETM R Brewer Date 3-27-02

Not Performed: N/A

*** End of Operation 15 ***

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OPERATION 20 Ice Prediction Briefing

Shop: SE
Cntrl Rm Console: NA
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 0.5

NOTE

Ref: NSTS 16007 (LI) NSTS Program Launch Commit Criteria - Hazardous Gas Subsystem and Appendix F defines the ET No-Ice Zone.

20-1 CICE

Conduct L-1 day ice prediction briefing with launch director.

PH-H Signature

A. Olin 4/02/02
PHH2

OMRSD S00FA0.900

USA
VM
026

A. OLIN

20-2 Operation - Ice Prediction Briefing complete.

*** End of Operation 20 ***

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OPERATION 30 Pre-launch Walkdown

Shop: SE
Cntrl Rm Console: NA
OPR: ETM
Zone: PAD
Hazard (Y/N): N
Duration (Hrs): 2.0

WARNING

Personnel working at heights greater than 4 feet and within 6 feet of an unguarded edge shall wear a safety harness with a lanyard secured to an approved tie off point, substantial structural member (no handrails) or a properly installed life line.

NOTE

This operation is performed at approximately L-20 hours. When this operation is performed in support of a 24 hour scrub turnaround, the preceding launch scrub post drain walkdown and this pre-launch walkdown may be performed concurrently.

Inspections may also be performed from the RSS, GO₂ Vent Arm (GVA), -Y OWP, or +Y OWP if still extended and accessible.

Ref: 80901019010 (LI) ET Post Build Acceptance and In-Process Rework Requirements Manual - Offsite

NASA ET Mechanical Engineer (PH-H) or designee shall function as team leader. Following personnel are optional walkdown participants.

NASA Engr	(4)
SFOC Engr	(2)
LMSSC - LSS	(1)
Boeing - LSS	(1)
SRB ELE	(1)
Thiokol - LSS	(1)

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30-1 Debris inspection team perform walkdown of SSV and MLP per following:

1. Team leader verify S6444 pre-test briefing complete.
2. Assemble following essential personnel

NASA PH-H Engineering - 1
SFOC ETM Engineering - 1
3. Inspect following areas (as a minimum) from the MLP, RSS and FSS to identify/ resolve potential debris sources.

Areas to be inspected

A. Launch vehicle external surfaces

- Orbiter
- SRB's
- External Tank

B. MLP surfaces

- LH and RH SRB holddown posts
- Deck including deck bolts, fixtures, and edge gutters
- SSME LH and RH SRB exhaust openings, and sound suppression (SS) troughs
- TSM's and camera housings

4. Ref Table 30-1, document and SIM Photograph SSV and Launch PAD Configuration.

Description: Pre launch walkdown.

OMRSD S00U00.030-1

SPC NO 51104/51160
DISC / FRAME NOS: 1-17

WC 150 USA
Dev. GL
No. 01
FEB 27 '02

WC 150 USA
FEB 27 '02

USA
VM
028

MAY 8 1992

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30-2 Record all facility discrepancies in S0007. Submit copy to PAD leader and notify TBC/CTC. Verify no constraints to continue.

FORWARD DESCRIPTION(S) OF DEBRIS FOUND TO SFOL GL FOR ENTRY INTO PROCESSING DEBRIS / FOD DATABASE

WC 150 USA
FEB 27 '02
Dey. GC
No. 02
P
WC 150 USA
FEB 27 '02

PH-H *A. Olin* Date 4/4/02

A. OLIN

ETM *Tom Ford* Date 4.3.02

30-3 Operation - Pre-launch Walkdown complete.

Table 30-1 Photo Requirements for SSV and Launch Pad Configuration			
Photos from MLP			
<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
ET -Z	Vertical	28 mm	
Aft Dome	Horizontal	28 mm	
Aft Dome	Horizontal	35-70 mm	
LH SRB from North	Horizontal	35-70 mm	All water troughs in view
LH SRB from North	Vertical	35-70 mm	3-4 water troughs in view
LH SRB from East	Vertical	35-70 mm	
RH SRB from North	Horizontal	35-70 mm	All water troughs in view
RH SRB from North	Vertical	35-70 mm	3-4 water troughs in view
RH SRB from West	Vertical	35-70 mm	
SRB Heater Elec T-0	Horizontal	35-70 mm	Foam intrusion; May need flash
North HDP	Vertical	35-70 mm	Representative view
South HDP	Vertical	35-70 mm	Representative view
TSM T-0 LH ₂	Vertical	35-70 mm	Flash needed
TSM T-0 LO ₂	Vertical	35-70 mm	Flash needed
Orbiter Left & Right Wing	Vertical	35-70 mm	From below ET (1 Photo each wing)

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135 Ft Level Photos

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
LO ₂ UMB	Vertical	35-70 mm	From OWP usually during T5401
LH ₂ UMB	Vertical	35-70 mm	From OWP usually during T5401

215 Ft Level Photos

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
ET surfaces from FSS	Vertical	35-70 mm	
LH SRB Frustrum and FWD skirt	Vertical	35-70 mm	
RH SRB Frustrum and FWD skirt	Vertical	35-70 mm	
Jack Pad C/O's	Horizontal	35-70 mm	Flash needed (1 each C/O)
LO ₂ Ogive Cable Tray	Vertical	35-70 mm	From RSS roof

255 Ft Level Photos

<u>Photo</u>	<u>Camera Orientation</u>	<u>Lens</u>	<u>Notes</u>
ET surfaces with GO ₂ vent ducts in view	Vertical	35-70 mm	
GO ₂ vent ducts	Horizontal	250 mm	

*** End of Table 30-2 Photo Requirements for SSV and Launch Pad Configuration

*** End of Operation 30 ***

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OPERATION 40 Ice Frost Debris Console Initial Configuration Setup

Shop: SE

Cntrl Rm Console: FR2

OPR: ETM

Zone: NA

Hazard (Y/N): N

Duration (Hrs): 3.0

NOTE

The next step sets up the photo processing laptop for use in the Firing Room. This is not a constraint to set up of the console or to final inspection team operations. Network or equipment failures on the photo processing machine shall be annotated below.

40-1 Configure computer to perform image processing, analysis, and recording:

1. Connect following equipment at Ice/Frost console:
 - power cable to computer
 - "Dazzle" capture card to laptop parallel port
 - "Y" adapter to laptop PS2 port
 - keyboard to keyboard port on "Y" adapter
 - mouse to mouse port on "Y" adapter
 - monitor to laptop
2. Insert Xircon Network Card into Personal Computer PCMCIA port.
3. Connect ethernet (gray) cord to Xircon Network Card.
4. Remove terminator from video cable.
5. Plug BNC-to-RCA adapter into end of video cable.
6. Plug video cable into "Dazzle" DVC "video in".
7. Power-up Trouble Console VCR.



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OMI S6444 J03
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8. Log-on to KSC Ground Ops. Click-on Start/Programs/Dazzle.
9. Confirm above equipment as operational and record results.

Results NORMAL OPS

ETM R Brewer

NOTE

The next step verifies the setup of the infrared scanners. This is not a constraint to set up of the ice console. IR scanner condition shall be annotated below.

- 40-2 Verify IR scanner operation condition, annotate below.

'Ready'
RSS: R Brewer
'Ready'
CS 2: R Brewer

NOTE

The next step verifies the operation of console monitors in the Firing Room. This is not a constraint to set up of the console or to final inspection team operations. Equipment condition shall be annotated below.

- 40-3 Verify console condition by powering on monitors and tape recorders.

Monitors: 'OK'

Tape recorders: 'OK'

NOTE

ET OTV pre-mapping/initial position of cameras may be performed in random order.

Ref: 79K24576 (LI) OTV System Installation, LC 39, Pad A and

Ref: 79K24522 (LI) OTV System Installation, LC 39, Pad B define OTV camera locations.

FOV designates field-of view. RSS and -Y OWP must be retracted for completion of pre-mapping.

Pre-mapping steps/substeps in the remainder of this operation need not be performed if supporting a scrub turnaround and if performed during a previous run.

It is preferred to record all pre-mapping scanning on a single tape. However, multiple tapes may be used when lighting/ launch countdown constraints necessitate such.

40-4 CVM1 JTV1 223

Perform OTV pre-mapping of External Tank exterior surfaces using OTV Cameras 004/104, 009/109, 013/113, 033/133, 042/142, 054/154, 055/155, 056/156, 060/160, 061/161, 062/162, 063/163, 064/164, 065/165, 066/166, and 067/167 as follows:

- **Insert** designated pre-map tape into trouble console VCR.
- **Punch-up** camera number on trouble monitor.
- **Start** recording on pre-map tape. **Record** start time (GMT).
- **Scan** from top-to-bottom, left-to-right and right-to-left at approximately full zoom-in.
- **Stop** recording on pre-map tape. **Record** stop time (GMT).
- **Record** data in Table 40-1.
- **Repeat** with each OTV camera listed until each has been used to scan the External Tank.
- **Remove** pre-map tape from trouble console VCR.

ETM R Brewer Date 4/4/02

Not Performed: n/a

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40-5 CVM1 JTV1 223

Position OTV Cameras 004/104, 009/109, 013/113, 033/133, 042/142,
054/154, 055/155, 056/156, 060/160, 061/161, 062/162, 063/163, 064/164,
065/165, 066/166, 067/167, 070/170, and 071/171 to initial positions as
defined in Table 40-2.

ETM R Brewer Date 4/4/02

Not Performed: N/A



Table 40-1 ET Pre-Mapping Data		Tape #
OTV Camera	Start Time (GMT)	Stop Time (GMT)
004 / 104	11:33	11:39
009 / 109	11:40	11:46
013 / 113	11:17	11:20
033 / 133	11:49	11:50
042 / 142	11:51	11:58
054 / 154	*	
055 / 155	*	
056 / 156	*	
060 / 160	*	
061 / 161	11:09	11:15
062 / 162	11:16	11:17
063 / 163	12:00	12:12
064 / 164	12:12	12:22
065 / 165	*	
066 / 166	12:23	12:29
067 / 167	*	

Notes: '104' is DARK, SLIGHTLY OUT OF FOCUS. '109' SOME DARK AREAS.
'142' SOME DARK AREAS. '164' SOME DARK AREAS AND SLIGHT FOCUS
PROBLEM. '166' SOME DARK AREAS.

* ON SEPARATE TAPE - PERFORMED BY 'OTV'

R Brewer CTM
04-04-02



Table 40-2 OTV Camera Initial Positions	
OTV Camera	Initial Position
004 / 104	FOV centered on GUCP
009 / 109	FOV on LH ₂ Umbilical including ET/Orbiter interface. Vary close-up and wide angle views with 063/163 and 064/164.
013 / 113	Full zoom in. View SW GO ₂ Vent Louver area.
033 / 133	FOV perpendicular to ET and with LO ₂ -to-Intertank splice at frame top and LH ₂ -to-Intertank splice at frame bottom. Then tilt down until XT2058 is in frame center.
042 / 142	FOV centered on Orbiter Access Arm-to-Orbiter interface.
054 / 154	FOV to encompass approximately 3 feet forward of XT2058 to 2 feet aft of XT2058. Orbiter wing and SRB should be in view at frame left.
055 / 155	Set FOV on north bridge LH ₂ pipeline flange.
056 / 156	FOV with LH ₂ Aft Dome in frame bottom and XT2058 in view at frame top.
060 / 160	Full zoom in. View SW GO ₂ Vent Louver area.
061 / 161	Full zoom-in. Adjust FOV until ET LO ₂ -to-Intertank splice is centered vertically and view is perpendicular to ET. Pan right until edge of the ET comes into view. Note: LO ₂ Tank may pass out-of-view.
062 / 162	Full zoom in. View NW GO ₂ Vent Louver area.
063 / 163	FOV on LH ₂ Umbilical including ET/Orbiter interface. Vary close-up and wide angle views with 009/109 and 064/164.
064 / 164	FOV on LH ₂ Umbilical including ET/Orbiter interface. Vary close-up and wide angle views with 009/109 and 063/163.
065 / 165	Full zoom out. Set FOV on aft part of ET with frame bottom approximately 2 feet below LH ₂ Aft Dome.
066 / 166	FOV perpendicular to ET with LO ₂ -to-Intertank splice at frame top. Then tilt down until Orbiter RH Wing/SRB intersection is in frame lower right.
067 / 167	Set FOV with LH ₂ Aft Dome toward frame bottom and 2 nd black ring of SRB in view.
070 / 170	Select down wind camera of these two as wide angle view of the SSV.
071 / 171	Set up wind camera for close-up view of SSME's.

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40-6 Operation - Ice Frost Debris Console Initial Configuration Setup complete.

ETM R Brewer Date 4/4/02

*** End of Operation 40 ***

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APPROVED

OPERATION 50 SSV Debris Assessment

Shop: SE
Cntl Rm Console: FR2
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 18.0

NOTE

Steps in this operation are contingent upon progression of launch countdown operations and may not be performed if countdown is terminated.

Entire Operation Not Performed: N/A

NOTE

Until otherwise indicated, all times are referenced to S0007, S0014 or S0037 timelines.

No operations/steps within this subtask OMI may be performed as a stand-alone procedure. This OMI may only be performed as a subtask to S0007/S0014/S0037.

NOTE

Ref: SPI SP-519 (LI) OMI and OM Implementation and Ref: SFOC GO0007 (LI) Quality Planning Requirements Document (QPRD), following step complies with requirements for ROR-as-CMQC function.

50-1

CTIF TBC
TBC CMQC 136

Notify TBC that CTIF will perform the CMQC function for STS 110, S6444 run 1. Request TBC notify CMQC that the ROR-as-CMQC option will be exercised for STS 110, S6444 run 1.

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OMI S6444 J03
APPROVED

50-2

CTC	TBC	232
TBC	CTIF	136

Perform OTV and ice/frost monitoring area setups.

ETM R Brewer Date 4/4/02

50-3

CTIF	TBC	136
TBC	CTC	
CTC	STM	232

Verify Operation 10- Support Preparations complete.

ETM R Brewer Date 4/4/02

50-4

CTIF

Verify Operation 20 - Ice Prediction Briefing and Operation 30- Pre-launch Walkdown complete.

ETM R Brewer Date 4/4/02



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50-5

CTIF CVM1 222
CVM1 222

Verify:

- All OTV cameras are on, tapes in recorder, and ready to commence OTV scanning, monitoring, and recording.
- Trouble tape recorder is ready.
- Ice Frost Debris Console Initial Configuration Setup complete.

ETM R Brewer Date 4/4/02

50-6

CTIF CICE 222
CVM1
CVM2
CIPC
CTIF JYVR 138
CVM1 JTV1 223
CVM2 JTV2 225

All personnel participating in OTV operations report test ready status.

ETM R Brewer Date 4/4/02

Support: COMM

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OMI S6444 J03
APPROVED

50-7

CTIF TBC 136
TBC CTC 232

Ice Frost Console Area Setups for OTV scanning complete.
Report readiness.

ETM [Signature] Date 4/4/02
Cicateri
MS
18
Not Performed: N/A

50-8

CTIF CVM1 222

From start of LO₂ chilldown until seal deflation/GO₂ vent hood retraction, **monitor** the +Y/-Y GO₂ vent seal-to-ET interface for seal fretting and continuous GO₂ escape.

OMRS S00FB0.350-1

ETM R Brewer Date 4/4/02
Not Performed: N/A



01-09-2002
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OMI S6444 J03
APPROVED

NOTE

GO₂ vent seal fretting could induce damage to ET SOFI. Continuous GO₂ venting could result in formation of ice in the no ice zone (ref NSTS 16007). Ultimate decision to lift the vent hood rests with CMEC.

50-9

CTIF TBC 136
CMEC

If +Y/-Y GO₂ vent seal fretting or continuous GO₂ escape detected from start of LO₂ chilldown until seal deflation, **notify CMEC** for GO₂ vent hood removal.

ETM _____ *N/A* / _____ Date _____

Not Performed: _____

ET/CS

4-4-02

50-10

CTIF CIPC 222

Monitor wind speed and direction from start of LO₂/LH₂ chill down through launch/scrub. CIPC **notify** CTIF if winds measured at 38 knots or greater from North +/-30 degrees as measured at 60 feet.

ETM _____ *N/A* / _____ Date _____

Not Performed: _____

ET/CS

4-4-02

NOTE

Excessive vapors are defined as being more severe than those described in NSTS 08303 (LI) NSTS Program Ice/Debris Inspection Criteria or NSTS 16007 (LI) NSTS Program Launch Commit Criteria - Hazardous Gas Subsystem.

50-11

CTIF CVM1 222
CVM2

From start of LO₂/LH₂ loading until Prepressurization
(LO₂ at T-2M55s and LH₂ at T-1M57s):

1. **Monitor** following ET-Orbiter MPS areas for leakage:
 - LO₂ Feedline (portion external to the Intertank)
 - LH₂ Feedline
 - LH₂ Recirculation Line
 - LH₂ Aft Dome Manhole Cover(s)
 - ET-Orbiter LO₂/LH₂ Umbilical Disconnects
 - LH₂ T-0 Umbilical
 - LO₂ T-0 Umbilical

2. **Verify** no visible cryogenic liquid of excessive vapors.

OMRS S00FB0.360-1

ETM _____ *N/A* Date _____

Not Performed: E/S

4-4-02

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OMI S6444 J03
APPROVED

50-12

CTIF CVM1 222
CVM2

Monitor and videotape following ET TPS surface areas and GO₂ Vent Area during LO₂/LH₂ loading through Prepressurization (LO₂ at T-2M55s and LH₂ at T-1M57s):

- LH₂ Aft Dome
- LH₂ Barrel
- Intertank (external)
- LO₂ Tank
- GO₂ Vent Area
- Protuberances

OMRS S00FB0.005-1

ETM W. Richards Date 4-4-02
W. RICHARDS

Not Performed: NA

50-13

CTIF CVM1 222

Perform Operation 60 - Group 1 Monitoring.

ETM M. Wollam Date 4-4-02
M. WOLLAM

Not Performed: NA

01-09-2002
APPROVED

OMI S6444 J03
APPROVED

50-14

CTIF CVM2 222

Perform Operation 70 - Group 2 Monitoring.

ETM _____

ME
10

Date

4/4/02

Not Performed:

NA

50-15

CTIF CVM2 222

Once per hour minimum, after start of LO₂/LH₂ (until LO₂/LH₂ low level sensors read dry), scan LO₂ feed line brackets and flange closeouts per Table 50-1.

ETM _____

M. Wollam

Date

4/4/02

M. Wollam

Not Performed:

NA

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OMI S6444 J03
APPROVED

50-16

CTIF CICE 222

As count proceeds, for concerns/ observations identified:

1. **Record** observation/concern on trouble tape per Table 50-1.
2. **Document** observed condition on Table 50-2, Observation Worksheet.

ETM ME 10 M. WOLLAM Date 4/4/02
M. Wollam
Not Performed: ME 10 ①

50-17

TBC CTIF 136
CTIF CICE 222

Perform Operation 80 - Final Inspection when called by
S0007/S0014/S0037.

ETM NA Date /
Not Performed: ME 10 4/4/02

① EIE
ME 10 4/4/02

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NOTE

Final SSV scan typically commences at L-2 hours.

50-18

CTIF CVM1 222
CVM2

Perform final SSV scan.

ETM _____ Date _____

Not Performed:

ME
10

4/4/02

50-19

CTIF CVM1 222
CVM2

At start of T-9 minute hold, **configure** OTV cameras for terminal count.

ETM _____ Date _____

Not Performed:

ME
10

4/4/02

WC
150
USA
JUN 27 '02
Dev 50
No. 01
P
MAY 3 '02
SEE DEV



NOTE

Ref: NSTS 16007 (LI) NSTS Program Launch Commit Criteria - Hazardous Gas Subsystem Appendix F - Ice Launch Commit Criteria defines "No-Go Conditions."

50-20

CICE CTIF 222

Verify there are no Ice Launch Commit Criteria "No-Go Conditions" being violated.

ETM R Brewer Date 4/4/02
Eng. Note: See OBSERVATION sheet 001 -

50-21

If winds are from the north (+/-30 degrees) and are 38 knots (peak as measured at 60 feet above ground) or greater:

1. Monitor/videotape nose cone area during high winds.
2. Verify:
 - A. No ice formation on the +Y and -Y GO₂ vent seal footprint areas.
 - B. No damage to the ET TPS at the +Y and -Y GO₂ vent seal footprint areas.
 - C. No damage to the +Y and -Y GO₂ vent seals themselves.
 - D. No evidence of GO₂ leakage from +Y/-Y GO₂ vent seals to ET interface.

USA
VM
026

OMRSD S00L00.150

ETM N/A Date 4-4-02

Not Performed:

ET
05

4-4-02

01-09-2002
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OMI S6444 J03
APPROVED

50-22

CTIF

Verify launch or launch scrub (drain back). Record data.

Launch _____ Scrub _____

Date 4/4/02 Time 14:30 GMT

Scrub at T- 4:40

ETM R Brewer Date 4/4/02

50-23

CTIF

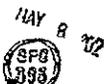
ET-Orbiter MPS monitoring for leakage and ET TPS Surface Areas
and GO₂ Vent Area monitoring/recording for launch complete.

USA
VM
026
OMRSD S00FB0.005-1
OMRSD S00FB0.360-1

ETM N/A Date /

Not Performed: 4/4/02

4-4-02



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NOTE

When completely filled and drain is initiated, it takes approximately 1 hour until the LH₂ tank low level sensors read dry, and approximately 1.5 hours until the LO₂ tank low level sensors read dry.

50-24

CTIF CVM1 222
CVM2

If launch scrubbed (or drain back declared) after start of LO₂/LH₂ slow fill mode:

- Perform Operation 90 - LO₂/LH₂ Drain Monitoring.
- Record observations/concerns on trouble tape per Table 50-1.
- Document all observations/concerns on Table 50-2 Observation Worksheet.

ETM _____ N/A Date _____

Not Performed: ET/03

4-4-02

50-25

CTIF

GO₂ Vent seal to ET interface monitoring for seal fretting and continuous GO₂ escape complete.

USA
0226

OMRSD S00FB0.350-1

ETM _____ N/A Date _____

Not Performed: ET/03

4-4-02

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APPROVED

50-26

CTIF CVM1 222
CVM2

Terminate scanning operations.

ETM R Brewer Date 4/4/02

50-27

CTIF CVM1 222
CVM2

Perform Operation 100 - Console Securing.

ETM R Brewer Date 4/4/02

50-28

CTIF

If LO₂/LH₂ tanking started, perform Operation 110 - Summary
Tape.

ETM R Brewer Date 4/4/02

Not Performed: N/A



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NOTE

Following step may be not performed at CTIF discretion.

50-29 CTIF TBC 136
 TBC STM

If Post Drain Walkdown to occur at night, request PAD xenon lighting be maintained/activated for duration of walkdown.

Not Performed: ME
10

4-4-02

NOTE

Post drain walkdown typically commences approximately 1.5 hours after LH₂/LO₂ low level sensors read dry.

50-30

CTIF

If launch scrubbed after start of LO₂/LH₂ tanking, perform Operation 120 - Post-Drain Walkdown.

ETM _____

ME
10

Date

4/4/02

Not Performed: N/A

50-31

CTIF

If launch occurred, perform Operation 130 - Post launch Walkdown.

ETM _____

N/A

Date

4/4/02

Not Performed: ME
10

4-4-02

01-09-2002
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OMI S6444 J03
APPROVED

50-32

CTIF

If launch occurred, perform Operation 140 - Film Review.

ETM _____

Date _____

Not Performed: _____

ME
10

50-33

SSV Debris Assessment complete.

MAY 8 2002

50-16

Table 50-1 Observation Documentation Procedure

1. CTIF CVM1 222 Locate anomaly/concern on pertinent OTV(s)
CVM2
2. CTIF Punch-up pertinent OTV on trouble monitor.
Update trouble tape log in table below.
3. CTIF Start the trouble tape.

NOTE

Trouble tape shall be allowed to run until sufficient OTV documentation of observation/concern has been made. OK to change OTV's while trouble tape is running.

4. CTIF After observation/concern has been documented on the trouble tape, stop the trouble tape. Update trouble tape log below.

TROUBLE TAPE LOG

Trouble Tape No.	Start Time (GMT)	Stop Time (GMT)	OTV	Description
<u>TT#1</u>	<u>13:55</u>	<u>14:02</u>	<u>154</u>	<u>LOZ FEEDLINE SCAN</u>
<u>"</u>	<u>14:14</u>	<u>14:18</u>	<u>134</u>	<u>HAZLINE-YARDS ^{EAST SIDE OF MLP} (ALSO IN 165)</u>
<u>"</u>	<u>14:32</u>	<u>15:02</u>	<u>180</u>	<u>PLANCK OF LEAK OTV 132, 134, 138, 165</u>

TROUBLE TAPE LOG



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Table 50-2 Observation Worksheet

OBSERVATION DOCUMENTATION

Record following information for condition observed:

Observation No. 001
Observed By: R. Speece / R. Brewer
Date 4/4/02 Time 09:10 GMT 14:10
Camera No. (or Walkdown) 165

Description:

Heavy VAPORS / SMALL AMOUNT OF LIQUID ON
LH₂ TRANSFER LINE ON EAST SIDE OF MLP / side 4.

Acceptance Rationale (or IPR/PR No.):

IPR in WORK.

CICE [Signature] Date 4/4/02
CTIF [Signature] Date 04/04/02

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Table 50-2 Observation Worksheet

OBSERVATION DOCUMENTATION

Record following information for condition observed:

Observation No. _____

Observed By: _____

Date _____ Time _____ GMT _____

Camera No. (or Walkdown) _____

Description:

Acceptance Rationale (or IPR/PR No.):

NA

CICE _____ Date _____

CTIF _____ Date _____

MAY 9 2002
2002

01-09-2002
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Table 50-2 Observation Worksheet

OBSERVATION DOCUMENTATION

Record following information for condition observed:

Observation No. _____

Observed By: _____

Date _____ Time _____ GMT _____

Camera No. (or Walkdown) _____

Description:

N A

Acceptance Rationale (or IPR/PR No.):

CICE _____ Date _____

CTIF _____ Date _____

01-09-2002
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Table 50-2 Observation Worksheet

OBSERVATION DOCUMENTATION

Record following information for condition observed:

Observation No. _____

Observed By: _____

Date _____ Time _____ GMT _____

Camera No. (or Walkdown) _____

Description:

Acceptance Rationale (or IPR/PR No.):

N A

CICE _____ Date _____

CTIF _____ Date _____

MAY 9 2002



01-09-2002
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Table 50-2 Observation Worksheet

OBSERVATION DOCUMENTATION

Record following information for condition observed:

Observation No. _____

Observed By: _____

Date _____ Time _____ GMT _____

Camera No. (or Walkdown) _____

Description:

Acceptance Rationale (or IPR/PR No.):

N A

CICE _____ Date _____

CTIF _____ Date _____

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Table 50-2 Observation Worksheet

OBSERVATION DOCUMENTATION

Record following information for condition observed:

Observation No. _____

Observed By: _____

Date _____ Time _____ GMT _____

Camera No. (or Walkdown) _____

Description:

Acceptance Rationale (or IPR/PR No.):

N A

CICE _____ Date _____

CTIF _____ Date _____



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Table 50-2 Observation Worksheet

OBSERVATION DOCUMENTATION

Record following information for condition observed:

Observation No. _____

Observed By: _____

Date _____ Time _____ GMT _____

Camera No. (or Walkdown) _____

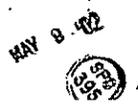
Description:

Acceptance Rationale (or IPR/PR No.):

N A

CICE _____ Date _____

CTIF _____ Date _____



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Table 50-2 Observation Worksheet

OBSERVATION DOCUMENTATION

Record following information for condition observed:

Observation No. _____

Observed By: _____

Date _____ Time _____ GMT _____

Camera No. (or Walkdown) _____

Description:

NA

Acceptance Rationale (or IPR/PR No.):

CICE _____ Date _____

CTIF _____ Date _____

*** End of Table 50-2 Observation Worksheet ***

*** End of Operation 50 ***

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OPERATION 60 Group 1 Monitoring LO₂ Chill Down Thru T-0

Shop: SE
Cntrl Rm Console: FR2
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 15.0

NOTE

Do not perform this operation if launch scrub declared before LO₂ Chill Down commences.

Operation Not Performed: NA

NOTE

This operation monitors LO₂ Ogive and Barrel and associated components/ areas from start of Chill Down through T-0 via OTV cameras 013/113, 060/160, 061/161, 062/162, 063/163 and 064/164.

OTV cameras 013/113 and/or 062/162 will view -Y GO₂ Vent Hood Seal at all times. At no time will both cameras be positioned away from the -Y GO₂ Vent Hood Seal.

OTV cameras 068/168 and 069/169 view SW and NE GO₂ Vent Areas respectively. These are fixed FOV cameras and do not have pan, tilt, etc. capability.

Steps in this operation are contingent upon progression of launch countdown operations and may be not performed if countdown is terminated.

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LO₂ Chill Down To L-2 Hour Mark

60-1 CVM1 JYVR 138

At start of vehicle LO₂ Chill Down, start recorders for cameras 004/104, 013/113, 060/160, 061/161, 062/162, 063/163, 064/164, 068/168, and 069/169.

ETM R Brewer Date 4/4/02

Support: COMM

60-2 Record LO₂ MPS Chill Down start date and time (GMT).

LO₂ MPS Chill Down Date 4/4/02 GMT Time 13:19 GMT

ETM R Brewer Date 4/4/02

60-3 CVM1 JTV1 223

From start of LO₂ Chill Down until start of LO₂ Fast Fill on OTV cameras 004/104, 013/113, 060/160, 061/161, 062/162, 063/163, 064/164, 068/168, and 069/169 monitor/videotape ET-TPS surfaces. No cryogenic liquid or excessive vapors allowed.

ETM R Brewer Date 4/4/02

Support: COMM

Not Performed: N/A

01-09-2002
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OMI S6444 J03
APPROVED

60-4 Record LO₂ Slow Fill start date and time (GMT).

LO₂ Slow Fill Date 4/4/02 GMT Time 13:42 GMT

ETM R Brewer Date 4/4/02

Not Performed: N/A

60-5 Record LO₂ Fast Fill start date and time (GMT).

LO₂ Fast Fill Date 4/4/02 GMT Time 13:58 GMT

ETM R Brewer Date 4/4/02

Not Performed: N/A

60-6 CVM1 JTV1 223

From start of LO₂ Fast Fill until LO₂ stable replenish mode is established, monitor/videotape ET-TPS surfaces on OTV cameras 004/104, 013/113, 060/160, 061/161, 062/162, 063/163, 064/164, 068/168, and 069/169. Scan LO₂ Tank. Alternate cameras and scan from Intertank to LO₂ Barrel Splice to GO₂ Vent Hood. No cryogenic liquid or excessive vapors allowed.

ETM N/A Date /

Support: COMM

Not Performed:

ME
10

4/4/02

01-09-2002
APPROVED

OMI S6444 J03
APPROVED

60-7 Record LO₂ Topping date and time (GMT).

LO₂ Topping Date _____ GMT Time _____ GMT

ETM _____ Date _____

Not Performed:

ME
10

4/4/02

60-8 Record LO₂ Stable Replenish mode start date and time (GMT).

LO₂ Stable Replenish Date _____ GMT Time _____ GMT

ETM _____ Date _____

Not Performed:

ME
10

4/4/02

60-9 CVM1 JTV1 223

From time LO₂ Stable Replenish mode is established until time for final SSV scan (approximately L-2 hours), **monitor, scan and videotape** ET-TPS surfaces on OTV cameras 004/104, 013/113, 060/160, 061/161, 062/162, 063/163, 064/164, 068/168, and 069/169. No cryogenic liquid or excessive vapors allowed.

ETM _____ Date _____

Support: COMM

Not Performed:

ME
10

4/4/02

MAY 8 1992

01-09-2002
APPROVED

OMI S6444 J03
APPROVED

Final SSV Inspection Scan

NOTE

Final SSV Inspection Scan should begin not later than 1.5 hours prior to start of T-9 minute hold (approximately L-2 hours) to allow ample time to finish. Final SSV Inspection Scan shall include the ET, SRB's and the Orbiter.

Final scan may be altered or partially performed in the event that time constraints will not permit a complete SSV scan prior to start of T-9 minute hold.

During Final SSV Inspection Scan the camera lights on OTV cameras 061/161 and 062/162 shall be turned "Off" when view passes over the Orbiter cockpit to preclude "distracting" the Flight Crew.

60-10 CVM1 JTV1 223

Perform Final SSV Inspection Scan with OTV cameras 004/104, 013/113, 060/160, 061/161, 062/162, 063/163 and 064/164. Scan passes shall view entire SSV with cameras at approximate full zoom in during final scan.

ETM _____ *N/A* Date _____

Not Performed: ME
10
4/4/02

01-09-2002
APPROVED

OMI S6444 J03
APPROVED

Terminal Count Camera Positions

NOTE

This step performed for SSME ignition only and may be not performed if launch is scrubbed prior to pick-up of T-9 minute count. Cameras must be positioned for ignition no later than T-9 minutes. "Spot" scanning after pick-up of the T-9 minute count is acceptable with CICE concurrence.

Cameras may be positioned for SSME ignition in an arbitrary order.

Camera positions may be altered real-time with CICE concurrence. Alterations should be determined prior to pick-up of T-9 minute count to allow sufficient time for OTV operators to rehearse camera movements.

CVM1 camera positions for SSME ignition are defined in Table 60-1.

60-11 CVM1 JTV1 223

Ref Table 60-1, position cameras 004/104, 013/113, 042/142, 054/154, 060/160, 062/162 for terminal count.

ETM _____ Date _____

Support: COMM

Not Performed: 

4/4/02

60-12 Operation - Group 1 Monitoring - LO₂ Chill Down Thru T-0 complete.

147 9 32


Table 60-1 CVM1 Camera Positions for Terminal Count

NOTE

This Table defines CVM1 camera positions for terminal countdown. Cameras should be positioned for ignition no later than pick-up of T-9 minutes count. "Spot" scanning after pick-up of the T-9 minute count is acceptable with CICE concurrence.

Cameras may be positioned for SSME ignition non-sequentially.

Camera positions may be altered real-time with CICE concurrence. Alterations should be determined prior to pick-up of T-9 minute count to allow sufficient time for operators to rehearse camera movements with ice console.

The GO₂ Vent Arm (GVA) retracts at T-2m30s.

CVM1 Camera Positions Are Defined As Follows:

004/104

GUCP centered in frame so that GUCP will stay in view throughout SRB "twang".

042/142

At approximately T-1 hour, view and monitor Orbiter access arm while Orbiter hatch is being closed.

At T-7m30s, watch Orbiter access arm retract, then view bipod strut in center of frame, LO₂ feedline fairing in top of frame, and Orbiter hatch in right of frame.

054/154

At T-3m50s, view Orbiter right hand body flap movement, then zoom out with Orbiter/ET umbilicals at approximate frame center, Orbiter trailing edge at frame bottom, and edge of +Y (RH) SRB just in view at frame right.

Table 60-1 CVM1 Camera Positions for Terminal Count

013/113

At T-2m30s, watch lift of GO₂ vent arm for debris and nose cone/vent louvers for ice damage. Immediately following lift of GO₂ vent arm, center frame on GO₂ vent louver and then zoom-out so that entire ET movement is seen during SRB 'twang' at SSME ignition.

060/160

At approximately T-2m30s, after GO₂ vent arm retracts, go full zoom in for a close-up inspection of the GO₂ vent louver. After CICE concurrence, go full zoom out and position camera with SSV centered and ET nose cone at frame top.

062/162

At approximately T-2m30s, after GO₂ vent arm retracts, go full zoom in for a close-up inspection of the -Y GO₂ vent louver. After CICE concurrence, zoom out until ET nose spike is at top of frame with ET centered.

061/161

At approximately T-4m00s, verify camera lights are off. Then position camera to view astronaut closing visor at T-2 minutes 00 seconds.

068/168 and 069/169

Immediately after GO₂ vent hood lift, turn lights off to preclude distracting orbiter crew when the GVA rotates to its latchback position.

***** End of Table 60-1 Camera Positions for Terminal Count *****

***** End of Operation 60 *****

01-09-2002
APPROVED

OMI S6444 J03
APPROVED

OPERATION 70 Group 2 Monitoring - LH₂ Chill Down Thru T-0

Shop: SE
Cntrl Rm Console: FR2
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 15.0

NOTE

Do not perform this operation if launch scrub declared before start of LH₂ Chill Down.

Operation Not Performed: N/A

NOTE

This operation monitors LH₂ Barrel and associated components/areas start of LH₂ Chill Down to pre-pressurization via OTV cameras 009/109, 033/133, 054/154, 055/155, 056/156, 065/165, 066/166 and 067/167.

Steps in this operation are contingent upon progression of launch countdown operations and may be not performed if countdown is terminated.

01-09-2002
APPROVED

OMI S6444 J03
APPROVED

LH₂ Chill Down To L-2 Hour Mark

70-1 CVM2 JYVR 138

At start of LH₂ Chill Down, start recorders for cameras 009/109, 033/133, 054/154, 055/155, 056/156, 065/165, 066/166 and 067/167.

ETM Wm Richards Date 4-4-02

W. RICHARDS

Support: COMM

70-2 Record LH₂ Chill Down start date and time (GMT).

LH₂ Chill Down Date 4-4-02 Time 1305 GMT

ETM Wm Richards Date 4-4-02

W. RICHARDS

70-3 CVM2 JTV2 225

From start of propellant loading until start of LH₂ Fast Fill on OTV cameras 033/133, 054/154, 055/155, 056/156, 065/165, 066/166 and 067/167, monitor/videotape ET-TPS surfaces. No cryogenic liquid or excessive vapors allowed.

ETM Wm Richards Date 4-4-02

W. RICHARDS

Support: COMM

Not Performed: N/A

01-09-2002
APPROVED

OMI S6444 J03
APPROVED

70-4 Record LH₂ Slow Fill start date and time (GMT).

LH₂ Slow Fill Date 4-4-02 Time 13:14:00 GMT

ETM Jim Britt Date 4-4-02

W. RICHARDS

Not Performed: ME 10

NA

②

70-5 Record LH₂ Fast Fill start date and time (GMT).

LH₂ Fast Fill Date 4-4-002 Time 1359 GMT

ETM Jim Britt Date 4-4-02

W. RICHARDS

Not Performed: ME 10

NA

②

70-6 CVM2 JTV2 225

From start of LH₂ Fast Fill until stable replenish mode is established, scan LH₂ Tank. Alternate OTV cameras 033/133, 054/154, 055/155, 056/156, 065/165, 066/166 and 067/167 and scan/videotape from LH₂ Aft Dome to Intertank.

ETM _____ Date _____

Support: COMM

Not Performed: ME 10

4/4/02

ODR RIE

②

ME 10

4/4/02

01-09-2002
APPROVED

OMI S6444 J03
APPROVED

70-7

Record start date and time (GMT) for LH₂ Topping.

LH₂ Topping Date _____ Time _____ GMT

ETM _____ Date _____

Not Performed:

ME 10
4/4/02

70-8

Record LH₂ Stable Replenish mode start date and time (GMT).

LH₂ Stable Replenish Date _____ Time _____ GMT

ETM _____ Date _____

Not Performed:

ME 10
4/4/02

70-9

CVM2 JTV2 225

During LH₂ Stable Replenish mode and until time for final scan (approximately L-1.5 hours), on OTV cameras 033/133, 054/154, 055/155, 056/156, 065/165, 066/166 and 067/167, **monitor/videotape** ET TPS surfaces including LO₂ Feed Line, LH₂ Feed Line, LH₂ Recirculation Line, LH₂ Aft Dome and manhole covers, LH₂/LO₂ Umbilicals, and TSM LH₂/LO₂ Umbilicals. No cryogenic liquid or excessive vapors allowed.

ETM _____ Date _____

Support: COMM

Not Performed:

ME 10
4/4/02

MAY 8 2002
368
2002

01-09-2002
APPROVED

OMI S6444 J03
APPROVED

Final SSV Inspection Scan

NOTE

Final SSV Inspection Scan should begin not later than 1.5 hours prior to start of T-9 minute hold (approximately L-2 hours) to allow ample time to finish. Final SSV Inspection Scan shall include the ET, SRB's and the Orbiter.

Final SSV Inspection Scan may be altered or partially performed in the event that time constraints will not permit a complete SSV scan prior to start of T-9 minute hold.

70-10 CVM2 JTV2 225

Perform Final SSV Inspection Scan with OTV cameras 009/109, 033/133, 054/154, 055/155, 056/156, 065/165, 066/166 and 064/164. Scan passes shall view entire SSV with cameras at full zoom in during final scan.

ETM _____ Date _____

Support: COMM

Not Performed: 

4/4/02

T-9 Minute Terminal Count

NOTE

Next step performed for terminal count only and may be not performed if launch is scrubbed prior to pick-up of T-9 minute terminal count. Cameras must be positioned for SSME ignition no later than T-9 minutes. 'Spot' scanning after pick-up of the T-9 minute terminal count is acceptable with CICE concurrence.

Cameras may be positioned for SSME ignition in an arbitrary order.

Camera positions may be altered real-time with CICE concurrence. Alterations should be determined prior to pick-up of T-9 minute count to allow sufficient time for OTV operators to rehearse camera movements.

CVM2 camera positions for terminal count are defined in Table 70-1.

70-11 CVM2 JTV2 225

Ref Table 70-1, position cameras 009/109, 033/133, 056/156, 065/165, 066/166 061/161, 070/170, 071/171 and 067/167 for terminal count.

ETM _____ Date _____

Support: COMM

Not Performed: _____

TIME TO

70-12 Operation - Group 2 Monitoring - LH₂ Chill Down Thru T-0 complete.

4/4/02

01-09-2002
APPROVED

OMI S6444 J03
APPROVED

Table 70-1 - CVM2 Camera Positions for Terminal Count

NOTE

This Table defines CVM2 camera positions for terminal countdown. Cameras should be positioned for ignition no later than pick-up of T-9 minutes count. "Spot" scanning after pick-up of the T-9 minute count is acceptable with CICE concurrence.

The Orbiter access arm (OAA) retracts at T-7M30S. Orbiter body flap movement occurs at T-3m50s.

Cameras may be positioned for SSME ignition non-sequentially

Camera positions may be altered real-time with CICE concurrence. Alterations should be determined prior to pick-up of T-9 minute count to allow sufficient time for operators to rehearse camera movements with ice console.

01-09-2002
APPROVED

OMI S6444 J03
APPROVED

Group 2 Camera Positions Are Defined As Follows:

033/133

Full zoom out. LO₂ feed line in frame center and MLP deck at bottom.

055/155

View ET aft dome with MLP deck just out of view at bottom, ET XT-2058 ring frame at frame top and both SRB's just in view at sides.

056/156

View ET aft dome with MLP deck just out of view at bottom. ET XT-2058 ring frame at frame top and both SRB's just in view at sides.

065/165

Full zoom out. SSV centered. MLP deck edge just in view at bottom.

066/166

ET centered. Intertank to LO₂ Barrel splice at frame top with the majority of Orbiter wing in view.

067/167

Center on GUCP for optimum view.

070/170 and 071/171

At T-9m00s, zoom in on space shuttle main engine with camera providing best view. Zoom out on SSME for wide angle view with other camera.

009/109

At approximately T-3m50s, position to view Orbiter body flap and elevons movement. Afterwards, center on LH₂ umbilical with -Y vertical strut at frame top.

061/161

At approximately T-1m30s, tilt-up to GO₂ Vent Footprint. Zoom in. Pause. If footprint is acceptable, zoom out and tilt down to view Orbiter nose/cockpit through liftoff.

***** End of Table 70-1 - CVM2 Camera Positions for Terminal Count *****

***** End of Operation 70 *****

01-09-2002
APPROVED

OMI S6444 J03
APPROVED

OPERATION 80 Final Inspection

Shop: SE
Cntrl Rm Console: FR2
OPR: ETM
Zone: PAD A/B
Hazard (Y/N): Y
Duration (Hrs): 3.0

NOTE

Final Inspection may not need to be performed depending on LO₂/LH₂ tanking and launch countdown, as determined by CTC/TTL.

Final Inspection Team stay time guidelines for each level are given in Table 80-1. These guidelines are for reference only and may be deviated from at PICE discretion.

Operation Not Performed:

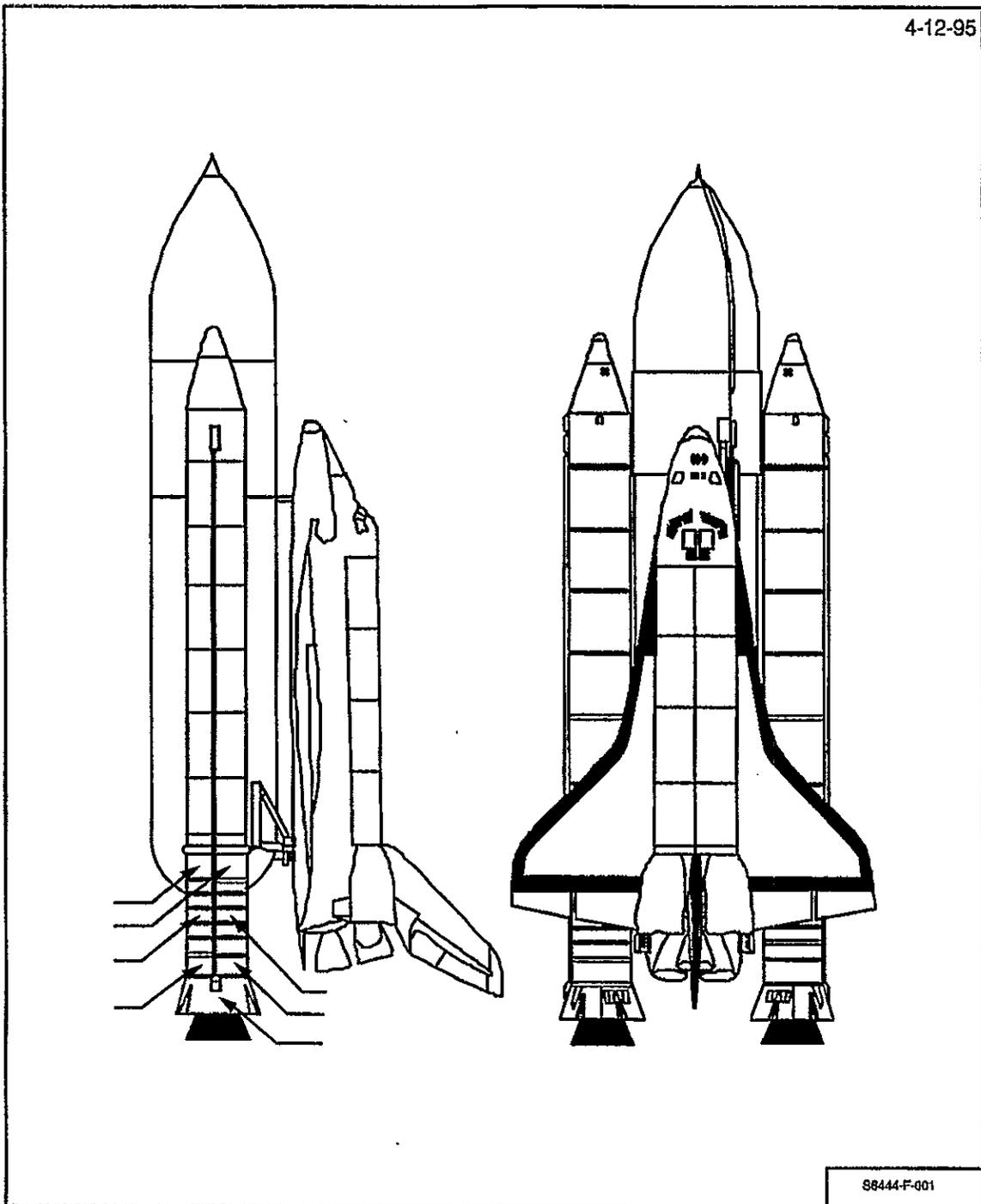
ME TO

4/4/02

Pages 80-3
Thru 80-20
Removed. operation
Not performed
MAY 6 '02

868
3ds

868
3ds



**Figure 80-1: Deck (0) Level
(For Reference Only)**

01-09-2002
APPROVED

OMI S6444 J03
APPROVED

OPERATION 90 LO₂/LH₂ Drain Monitoring

Shop: SE
Cntrl Rm Console: FR2
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 4.0

NOTE

This operation is contingent upon progression of launch countdown and is performed after start of cryo (LO₂/LH₂) loading and subsequent launch scrub, FRF, or WCDDT.

Operation Not Performed: NA

NOTE

This operation monitors the External Tank external surfaces during LO₂/LH₂ drain operations from time of detanking until 1.5 hours after LO₂/LH₂ low level sensors read dry via OTV 004/104, 009/109, 013/113, 033/133, 042/142, 054/154, 055/155, 056/156, 060/160, 061/161, 062/162, 063/163, 064/164, 065/165, 066/166, 067/167, 068/168, 069/169, 070/170, and 071/171.

Noted requirements satisfied by this operation: OMRS S00E00.021

90-1 Record start date/time (GMT) of LH₂ and LO₂ Tank Drain.

LH₂ Drain Start Date 4/4/02 Time 10:10 GMT

LO₂ Drain Start Date 4/4/02 Time 14:30 GMT

ETM Mark Wollan Date 4/4/02

01-09-2002
APPROVED

OMI S6444 J03
APPROVED

90-2 CVM1 JTV1 223

From start of LO₂ Tank Drain and LH₂ Tank Drain until respective LO₂/LH₂ low level sensors read dry, monitor ET external surfaces including LO₂ Feed Line, LH₂ Feed Line, LH₂ Recirculation Line, LH₂ Aft Dome and manhole covers, LH₂/LO₂ Umbilicals, TSM LH₂/LO₂ Umbilicals via OTV cameras. No cryogenic liquid or excessive vapors allowed.

ETM *A. Mark Walton* Date 4/4/02

Support: COMM

90-3 Record date/time (GMT) when LO₂/LH₂ low level sensors read dry.

LH₂ Sensors Dry Date 4/4/02 Time 1518 GMT

LO₂ Sensors Dry Date 4/4/02 Time 1503 GMT

ETM *A. Mark Walton* Date 4/4/02



01-09-2002
APPROVED

OMI S6444 J03
APPROVED

90-4 CVM1 JTV1 223

Monitor ET external surfaces including LO₂ Feed Line, LH₂ Feed Line, LH₂ Recirculation Line, LH₂ Aft Dome and manhole covers, LH₂/LO₂ Umbilicals, TSM LH₂/LO₂ Umbilicals via OTV cameras for 1.5 hours after LO₂/LH₂ low level sensors have read dry. No cryogenic liquid or excessive vapors allowed. Record date/time (GMT) when monitoring complete.

LH₂ Complete Date 4/4/02 Time 17:05 GMT

LO₂ Complete Date 4/4/02 Time 16:41 GMT

ETM R Brewer Date 4/4/02

Support: COMM

90-5 Completion of this operation satisfies noted requirements.

OMRSD S00E00.021

02/04

90-6 Operation - LO₂/LH₂ Drain Monitoring complete.

*** End of Operation 90 ***

01-09-2002
APPROVED

OMI S6444 J03
APPROVED

OPERATION 100 Console Securing

Shop: SE
Cntrl Rm Console: FR2
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 0.5

100-1

CTIF	TBC	136
TBC	CTC	232

OTV support for ET thermal protection system evaluation no longer required.

100-2

CTIF	JYVR	138
------	------	-----

Perform the following:

1. Turn off video recorders.
2. Remove tape cartridges.
3. OTV support no longer required.

Support: COMM

100-3

CTIF	CVM1	222
	CVM2	

Secure consoles by setting all monitors to "Off" position.
Report completion.

01-09-2002
APPROVED

OMI S6444 J03
APPROVED

NOTE

Perform next step only after a successful launch.

100-4

CTIF

Remove photo processing laptop computer from Firing Room.

Not Performed:

4-4-02
[Stamp: 100/05]

100-5

CTIF	TBC	136
TBC	CTC	232

Firing Room 2, ice frost monitoring area securing complete.

100-6

Operation 100 - Console Securing complete.

ETM *R. Brewer* Date *4/4/02*

*** End of Operation 100 ***

MAY 8 2002
[Stamp: 366 1935]

100-2

01-09-2002
APPROVED

OMI S6444 J03
APPROVED

OPERATION 110 Summary Tape

Shop: SE
Cntrl Rm Console: FR2
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 18.0

NOTE

Observations/concerns observed during count are typically recorded on the summary tape real-time (trouble tape).

110-1 CICE

After launch or launch scrub, prepare a summary tape to include observations/concerns noted during count.

110-2 Operation Summary Tape complete.

ETM R Brewer Date 4-4-02

*** End of Operation 110 ***

01-09-2002
APPROVED

OMI S6444 J03
APPROVED

OPERATION 120 Post Drain Walkdown

Shop: SE
Cntrl Rm Console: NA
OPR: ETM
Zone: PAD A/B
Hazard (Y/N): Y
Duration (Hrs): 2.0

NOTE

Post drain walkdown performed only after start of cryo (LH₂/LO₂) loading and subsequent launch scrub.

Operation Not Performed: N/A

WARNING

Personnel working at heights greater than 4 feet and within 6 feet of an unguarded edge shall wear a safety harness with a lanyard secured to an approved tie-off point, substantial structural member (no handrails) or a properly installed life line.

Personnel shall wear hardhats and flame retardant coveralls while performing post drain walkdown.

NOTE

Post drain walkdown typically commences approximately 1.5 hours after LH₂/LO₂ low level sensors read dry.

Post drain walkdown performed in support of a 24 hour scrub turnaround is typically coincident with the L-20 hour pre-launch walkdown for the ensuing launch attempt.

NOTE

NASA ET Mechanical Engineer (PH-H) or designee shall function as team leader. Following personnel are walkdown optional participants:

NASA Engr	(4)
SFOC Engr	(2)
LMSSC-LSS	(1)
Boeing LSS	(1)
SFOC Safety	(1)

120-1 NASA Lead ET Mechanical Systems Engineer (PH-H) verify essential personnel on station, properly attired, and ready to proceed with post drain walkdown.

Essential Personnel	
NASA Engineering (PH-H)	1
SFOC Engineering (ETM)	1

NOTE

“Hands-on Investigation” is applicable only to those areas which are not understood or fully defined and which cannot be adequately evaluated otherwise.

120-2 Perform post drain walkdown as follows:

WC
150
USA
FEB 27 '92
Dev. 120
01
SEE DEV
MAY 8 '92
806 898

1. Visually inspect ET TPS exterior surfaces after detanking and warm-up (approximately T + 4 hours after drain is initiated) from the MLP, FSS, and RSS as access permits.
2. Perform hands-on investigation of all areas suspected of violating Doc: NSTS 08303 (LI) NSTS PROGRAM ICE/DEBRIS INSPECTION CRITERIA (LI)

OMRSD S00E00.031

USA
VM
026

MAY 8 '92
862
848

01-09-2002
APPROVED

OMI S6444 J03
APPROVED

OPERATION 130 Post Launch Walkdown

Shop: SE
Cntrl Rm Console: NA
OPR: ETM
Zone: PAD A/B
Hazard (Y/N): Y
Duration (Hrs): 3.0

NOTE

Do not perform this operation after launch scrub.

Operation Not Performed:

ET/05

4-4-02

WARNING

Personnel working at heights greater than 4 feet and within 6 feet of an unguarded edge shall wear a safety harness with a lanyard secured to an approved tie off point, substantial structural member (no handrails) or a properly installed life line.

Personnel participating in walkdown shall wear hardhats and flame retardant coveralls.

NOTE

NASA ET Mechanical Engineer (PH-H) or designee shall function as team leader. Following personnel are walkdown optional participants:

- PAD MGMT. REP (1)
- NASA Engr (3)
- SFOC Engr (2)
- LMSSC-LSS (1)
- Boeing LSS (2)
- SRB ELE (1)
- Thiokol-LSS (1)
- SFOC Safety (1)

958
003

Pages 130-3
Thru 130-5
Removal Operation
Not Performed

958
395

01-09-2002
APPROVED

OMI S6444 J03
APPROVED

130-1 NASA (PH-H) verify following personnel on station, properly attired, and ready to proceed with post launch walkdown.

Essential Personnel		
NASA	PH-H	1
SFOC	ETM	1

NOTE

Post Launch Walkdown must be performed prior to washdown and Pad being opened for normal work.

130-2 Perform Post Launch Walkdown as follows:

1. Ref Table 130-1, **visually inspect** post launch pad/area to identify any lost flight or ground systems hardware and debris sources.
2. Ref Table 130-2, **document/SIMS photograph** launch PAD area configuration.

Description: Post Launch Walkdown

OMRSD S00U00.010-1

WC 150 USA
FEB 27 '02
Dev. GC
No. 01
P
WC 150 USA
FEB 27 '02

SFC NO N/A
DISC / FRAME NO N/A

130-3

Walkdown complete. Debris sources and lost flight hardware identified. No constraints to continue. FORWARD DESCRIPTION(S) FOUND TO SFOC QLC FOR ENTRY INTO PROCESSING DEBRIS / FOD DATABASE

WC 150 USA
FEB 27 '02
Dev. GC
No. 02
P
WC 150 USA
FEB 27 '02

PH-H N/A Date N/A
ETM N/A Date N/A

130-4 Operation - Post Launch Walkdown complete.

APPROVED
FEB 27 '02

01-09-2002
APPROVED

OMI S6444 J03
APPROVED

OPERATION 140 Film Review

Shop: SE
Cntrl Rm Console: NA
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 15.0

NOTE

This operation may be not performed after launch scrub.

Operation 140 Not Performed:

ET
05

4-4-02

NOTE

Analysis of Pad Debris Inspection Results determines priority for film review. All critical film (as determined by the Debris Team) must be reviewed as soon as possible after launch and no later than 36 hours prior to entry (of the Orbiter into the earth's atmosphere).

140-1 Review and analyze all engineering launch (and flight) film to:

- Identify any debris damage to the SSV
- Identify flight vehicle or ground system damage that could affect Orbiter flight operations of future SSV launches.

USA
VM
025

OMRSD S00U00.011-1

ETM N/A Date

140-2 Operation - Film Review complete.

ETM N/A Date

*** End of Operation 140 ***

MP

MAY 8 '02

988
P.J.N.

01-09-2002
APPROVED

OMI S6444 J03
APPROVED

OPERATION 145 IR Camera Removal

Shop: PH-H
Cntrl Rm Console: NA
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 2.0

WARNING

Hard hats required on the Pad when SSV is not present.

CAUTION

Exercise care to avoid dropping equipment, fasteners, etc from RSS roof to prevent damage to equipment or injury to personnel. All tools must be tethered.

NOTE

IR Camera removal from RSS Roof site may be not performed in launch scrub turnaround scenarios.

145-1 Remove IR camera at RSS Roof Site as follows.

1. **Remove** fasteners (2 pl) from camera housing front. **Retain** fasteners for reinstallation when front cover is installed.
2. **Install** camera housing front cover using previously removed fasteners (2 pl). **Tighten** fasteners (2 pl) wrench tight.

WARNING

Power cable is live. Care should be exercised when connecting power cable to avoid electric shock.

CAUTION

Do NOT allow back cover to exert undue force on cables when opening/rotating back cover.

3. **Rotate** camera housing back cover into open position by removing bolts with flat washers (20 pl). **Retain** bolts/washers for reinstallation.
4. **Disconnect:**
 - Power cable
 - Pan & tilt cable
 - Controller cable
 - OTV coaxial cable
5. **Unlock** spring pin at lower, left to release IR camera Unit in camera housing. **Remove** IR Camera Unit from camera housing by carefully sliding it out the back opening of the camera housing. **Support** IR Camera Unit during removal.
6. **Rotate** camera housing back cover into closed position. Do not pinch cables. **Secure** back cover by reinstalling bolts/flat washers (20 pl). **Tighten** bolts wrench tight.

WARNING

Isopropyl Alcohol is flammable and is a skin, eye and respiratory tract irritant that affects the central nervous system. Ensure adequate ventilation, avoid inhalation of vapors and do not use near heat, sparks or open flame. Skin contact may cause redness and pain, eye contact will cause severe eye irritation and may result in permanent damage. Inhalation of vapors in high concentrations has a narcotic effect on the central nervous system. Personnel shall wear N-Dex nitril gloves and chemical splash goggles. When working at eye level or above wear a face shield over goggles.

WS002.a 05-22-01

7. Clean IR Camera Unit lens plate using (1) roll 8305-00-519-3144 Rymple cloth dampened with (4) ounces 6810-00-543-7915 Isopropyl alcohol .
8. Route IR Camera Unit to VAB 3K1 for refurb/checkout.

NASA PH-H _____ N/A Date _____

USA ETM _____ N/A Date _____

Not Performed: _____
4-4-02

LET
05

NOTE

IR Camera removal from Camera Site 2 may be not performed in launch scrub turnaround scenarios.

145-2 Remove IR camera from Camera Site 2 as follows.

1. **Remove bolt(s) from camera housing front. Retain bolt(s) for reinstallation when front cover is installed.**
2. **Install camera housing front cover using previously removed bolt(s). Tighten bolt(s) wrench tight.**

WARNING

Power cable is live. Care should be exercised when connecting power cable to avoid electric shock.

CAUTION

Do NOT allow back cover to exert undue force on cables when opening/rotating back cover.

3. **Loosen screws (8 pl) securing camera housing back cover using Phillips screwdriver. Rotate camera housing back cover to open position. Retain bolts/washers for reinstallation.**
4. **Disconnect:**
 - Power cable
 - Pan & tilt cable
 - Controller cable (2 pl)
 - OTV coaxial cable
5. **Unscrew set screw(s) at lower, left/right to release IR camera Unit in camera housing. Remove IR camera Unit from camera housing by carefully sliding it out the back opening of the camera housing. Support IR camera Unit during removal.**
6. **Coat camera housing back cover O-ring with a single coat of (1) tube/jar 6505-00-133-8025 Petroleum Jelly, Vaseline (or equivalent) .**

01-09-2002
APPROVED

OMI S6444 J03
APPROVED

7. **Rotate** camera housing back cover into closed position. Do not pinch cables. **Secure** back cover by installing screws (8 pl). **Tighten** screws wrench tight using Phillips screwdriver.

WARNING

Isopropyl Alcohol is flammable and is a skin, eye and respiratory tract irritant that affects the central nervous system. Ensure adequate ventilation, avoid inhalation of vapors and do not use near heat, sparks or open flame. Skin contact may cause redness and pain eye contact will cause severe eye irritation and may result in permanent damage. Inhalation of vapors in high concentrations has a narcotic effect on the central nervous system. Personnel shall wear N-Dex nitril gloves and chemical splash goggles. When working at eye level or above wear a face shield over goggles.

WS002.a 05-22-01

8. **Clean** IR Camera Unit lens plate using (1) roll 8305-00-519-3144 Rymple cloth dampened with (4) ounces 6810-00-543-7915 Isopropyl alcohol .
9. **Route** IR Camera Unit to VAB 3K1 for refurb/checkout.

NASA PH-H _____ N/A Date _____

USA ETM _____ N/A Date _____

Not Performed:

ET
05

4-4-02

*** End of Operation 145 ***

01-09-2002
APPROVED

OMI S6444 J03
APPROVED

OPERATION 150 Final Report

Shop: SE
Cntrl Rm Console: NA
OPR: ETM
Zone: NA
Hazard (Y/N): N
Duration (Hrs): 0.5

NOTE

This operation may be not performed after launch scrub.

Operation 150 Not Performed: _____

ET
05

4-4-02

150-1 Assemble final report by attaching following reports to this OMI.
Reference each to this step.

Post Launch PAD Assessment
SRB Assessment
Launch Film Review
Launch Day Video Review
Orbiter Landing Assessment
ET Separation Review

150-2 Final report assembly complete.

ETM _____ N/A _____ Date _____

150-3 Operation - Final Report complete.

*** End of Operation 150 ***

MP
MP

MAY 8 102



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*****
* PROGRAM PRA120 SELECTION CRITERIA
*-----*
* RPT TYPE: IPR
* PR GROUP:
* WORK AREA CD:
* PR ELEM CD:
* STS NO:
* Starting RPT DT: 03/27/02
* Ending RPT DT: 05/22/02
* LRU or Non-LRU: B
* PRACA EFF CD:
* EICN:
* RPT STATUS: OP
* DETECTED DURING: S6444
*-----*
* Sorted by DETECTED DURING, PR ELEM CD, and EICN
*-----*
*****

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* NO DATA FOUND ON THE DATABASE FOR THE SELECTED PARAMETERS *

* END OF REPORT *



TOP/WAD Deviation **DILS: 95330**

WC
140
USA
FEB 28 02

Dev No. GC/01 DILS No. 94063(1) Page 1 of 1

TOP/WAD No. S6444	REV/CHG/VER <u>J02</u> <u>J03</u>	<input checked="" type="checkbox"/> In Family <input type="checkbox"/> Out of Family <input checked="" type="checkbox"/> NMA	Cause Code Org (B,D,E,G,H,L,N,O,P,Q,S,T,V) E	Cause Code Reason 10-Tech Chg 20-Proc Chg 30-Auth Error 40-Rewrite 20
First Use <input type="checkbox"/> SRB BI- <input type="checkbox"/> ET <input type="checkbox"/> GSE <input checked="" type="checkbox"/> STS-109	Effectivity: <input type="checkbox"/> ORB /FLT <input type="checkbox"/> FRCS/POD /FLT <input type="checkbox"/> SSME /FLT			
Affected: <input type="checkbox"/> OMRS/ACOMC/OMP <input type="checkbox"/> Design Req'ts <input type="checkbox"/> Haz Step(s) <input type="checkbox"/> PPE		<input checked="" type="checkbox"/> Internal Review Req.		
Contractor OPR <u>D. Seale ETM 1/11/02</u>	Contractor Test Conductor <u>J. Glors 1/11/02</u>	Gov OPR <u>James O. Clark 1/14/02</u>		
Contractor Test Project Engineer <u>W. J. (Walker) 1-11-02</u>	Other <u>John Ford 1/11/02</u>	Gov't Project Engineer		
Contractor Safety	Other	Gov't Test Director or Contractor Chief TC <u>J. P. Scully NTP 1/11/02</u>		

① Change 202 TO J03
 R. Brewer ET Eng. 2/26/02

Global Change	
Page Number	Step Number
30-2	30-1 s/s 4
80-7	80-2 s/s 2
130-2	130-2 s/s 2

Add the following:

SPC No: _____

Disc / Frame Nos: _____

Reason: Ensure traceability and preservation of L-20 Hour, Final Inspection, and Post Launch walkdown photo's.

MAY 8 02
SPC 398

Originator (print) R. Seale	SPDMS ID T08011	Phone 1-3348	Organization ETM	Date 1/11/02	<input checked="" type="checkbox"/> Perm <input type="checkbox"/> Temp <input type="checkbox"/> Temp-Recycle
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TOP/WAD Deviation [✓] DILS 9533

WC 140 USA

Dev No. GC/02 DILS No. 94064(3) Page 1 of 1

TOP/WAD No. S6444	REV/CHG/VER <u>J02</u> <u>J03</u>	<input type="checkbox"/> In Family <input checked="" type="checkbox"/> Out of Family <input checked="" type="checkbox"/> NMA	Cause Code Org (B,D,E,G,H,L,N,O,P,Q,S,T,V) E	Cause Code Reason 10-Tech Chg 20-Proc Chg 30-Auth Error 40-Rewrite 20
First Use <input type="checkbox"/> SRB BI- <input type="checkbox"/> ET <input type="checkbox"/> GSE <input checked="" type="checkbox"/> STS-109	Effectivity: <input type="checkbox"/> ORB /FLT <input type="checkbox"/> FRCS/POD /FLT <input type="checkbox"/> SSME /FLT	Affected: <input type="checkbox"/> OMRS/ACOMC/OMP <input type="checkbox"/> Design Req'ts <input type="checkbox"/> Haz Step(s) <input type="checkbox"/> PPE <input checked="" type="checkbox"/> Internal Review Req.	Contractor OPR <u>R. Seale ETM 1/11/02</u>	
Contractor Test Project Engineer <u>Tom Ford 1/11/02</u>		Contractor Test Conductor <u>Tom Ford 1/11/02</u>	Gov't OPR <u>Robert F. ... 1/11/02</u>	Gov't Project Engineer <u>Robert F. ... 1/11/02</u>
Contractor Safety		Other	Gov't Test Director or Contractor Chief TC <u>Jeff ... 1/11/02</u>	

① Change J02 to J03
② R Brewer Et Eng. 2/26/02

Global Change	
Page Number	Step Number
30-3	30-2
80-8	80-3
120-3	120-3
130-72	130-3

Add the following:

Forward description(s) of debris found to SFOC QC for entry into Processing Debris / FOD Database.

Reason: Ensure debris items found during walkdown are entered into appropriate Processing Debris / FOD Database.

MAY 8 2002
SPC 396

Originator (print) R. Seale	SPDMS ID T08011	Phone 1-3348	Organization ETM	Date 1/11/02	<input checked="" type="checkbox"/> Perm <input type="checkbox"/> Temp <input type="checkbox"/> Temp-Recycle
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TOP/WAD Deviation

Dev No. 50/01 DILS No. 94394(S) Page 1 of 1

TOP/WAD No. S6444	REV/CHG/VER <i>JOB # Richards W/HR 1-15-02</i>	<input type="checkbox"/> In Family <input checked="" type="checkbox"/> Out of Family	Cause Code Org (A,D,E,G,H,L,N,O,P,Q,S,T,V) E	Cause Code Reason 10-Tech Chg 20-Proc Chg 30-Auth Error 40-Rewrite 30
First Use <input type="checkbox"/> SRB BI- <input type="checkbox"/> ET <input type="checkbox"/> GSE <input checked="" type="checkbox"/> STS-108	Effectivity: <input type="checkbox"/> ORB /FLT <input type="checkbox"/> FRCS/POD /FLT <input type="checkbox"/> SSME /FLT			
Affected: <input checked="" type="checkbox"/> OMRS/ACOMC/OMP <input type="checkbox"/> Design Req'ts <input type="checkbox"/> Haz Step(s) <input type="checkbox"/> PPE		<input checked="" type="checkbox"/> Internal Review Req.		
Contractor OPR <i>R. Seale</i>	Contractor Test Conductor		Gov't OPR	
Contractor Test Project Engineer <i>1/15/02</i>	Other <i>SEALEK ETM 1-15-02</i>		Gov't Project Engineer	
Contractor Safety	Other		Gov't Test Director or Contractor Chief TC	

Page Number: 50-10 Step Number: 50-19

Add step 50-19.1 as follows:

50-19.1 CTIF ~~CPC~~ ^{Richards} ~~222~~ ^{W/HR 1-15-02}

Start continuous recording per Table 50-1 at pick-up of T-9 Minute count including following events:

- T-7M30S OAA retraction on camera OTV 008/108 or 042/142.
- T-3M55S Orbiter elevon movement on OTV 009/109, 054/154, 063/163, 064/164.
- T-2M30S GOX Vent Seal retraction, +Y / -Y GOX Vent Louvers, and GOX Vent Seal Footprints on OTV 013/113, 060/160, 061/161, 062/162, 068/168, and 069/169.
- T-1M00S through last view of vehicle during ascent on NASA Select (channel 179).

ETM: _____ N/A Date: _____

Not Performed: 15/02
4-4-02

Reason: Ensure critical events are recorded via real-time VCR.

MAY 8 12 583

Originator (print) R. Seale	SPDMS ID T08011	Phone 1-3348	Organization ETM	Date 1/15/02	<input checked="" type="checkbox"/> Perm <input type="checkbox"/> Term <input type="checkbox"/> Temp-Recycle
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TOP/WAD Deviation 0125 95332

WC 140 USA 28 02

120/01

Dev No. <u>120/01</u>	DILS No. <u>94065(-)</u>	Page 1 of 1
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TOPWAD No. S6444	REV/CHG/VER <u>102</u> <u>103</u>	<input type="checkbox"/> In Family <input checked="" type="checkbox"/> Out of Family <input checked="" type="checkbox"/> NMA	Cause Code Org (B,D,E,G,H,L,N,O,P,Q,S,T,V) E	Cause Code Reason 10-Tech Chg 20-Proc Chg 30-Auth Error 40-Rewrite 20
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First Use SRB BI- ET GSE STS-109

Effectivity: ORB /FLT FRCS/POD /FLT SSME /FLT

Affected: OMRS/ACOMC/OMP Design Req'ts Haz Step(s) PPE Internal Review Req.

Contractor OPR <u>R Seale ETM 1/11/02</u>	Contractor Test Conductor <u>J Gross occ 1/11/02</u>	Gov't OPR <u>PH-112</u>
Contractor Test Project Engineer <u>John Rej (Walker) 1-11-02</u>	Other <u>Tom Ford 1/11/02</u>	Gov't Project Engineer <u>John Rej 1-11-02</u>
Contractor Safety	Other	Gov't Test Director or Contractor Chief <u>Jeff Sandjino 1/11/02</u>

Change 102 to 00
R Seale ET Eng 01/11/02

Page Number: 120-2 Step Number: 120-2

Add the following as s/s 3

3. Photograph any vehicle / facility concerns observed.

SPC No: 51159/51161/51162

Disc / Frame Nos: 1-14/1-37/1-8/1-2

Reason: Ensure traceability and preservation of Post Drain walkdown photo's.



Originator (print) R. Seale	SPDMS ID T08011	Phone 1-3348	Organization ETM	Date 1/11/02	<input checked="" type="checkbox"/> Perm <input type="checkbox"/> Temp <input type="checkbox"/> Temp-Recycle
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TOP/WAD Deviation *DLS: 95333*

WC 140 USA

FEB 28 02

Dev No. 130/01 DILS No. 94097 (3) Page 1 of 1

① Change - J02 TO J03
R Brewer ET Eng. 02/26/02

TOP/WAD No. S6444	REV/CHG/VER <u>J02</u> <u>J03</u>	<input checked="" type="checkbox"/> In Family <input type="checkbox"/> Out of Family <input checked="" type="checkbox"/> NMA	Cause Code Org (B,D,E,G,H,L,N,O,P,Q,S,T,V) E	Cause Code Reason 10-Tech Chg 20-Proc Chg 30-Auth Error 40-Rewrite 20
First Use <input type="checkbox"/> SRB BI- <input type="checkbox"/> ET <input type="checkbox"/> GSE <input checked="" type="checkbox"/> STS-108	Effectivity: <input type="checkbox"/> ORB /FLT <input type="checkbox"/> FRCS/POD /FLT <input type="checkbox"/> SSME /FLT	Affected: <input type="checkbox"/> OMRS/ACOMC/OMP <input type="checkbox"/> Design Req'ts <input checked="" type="checkbox"/> Haz Step(s) <input type="checkbox"/> PPE <input checked="" type="checkbox"/> Internal Review Req.	Contractor OPR <i>R Seale 1/10/02</i>	
Contractor Test Project Engineer <i>Frank J. (Walker) 1-11-02</i>	Contractor Test Conductor <i>J Gross 02/11/02</i>	Gov't OPR <i>PH-112</i>	Gov't Project Engineer <i>1-11-02</i>	
Contractor Safety <i>Lenny Shupe 1/19/02</i>	Other <i>SE check Richards 1/10/02</i>	Gov't Test Director or Contractor Chief TC <i>1/11/02</i>		

Page Number: 130-1 Step Number: 130-1

Add following to list of walkdown participants in 2nd Note on pg 130-1:

Pad Mgmt Rep (1)

Reason: Inclusion of personnel from the Pad Management Office will expedite identification and resolution of FOD and facility damage identified during the Post Launch Walkdown.

MAY 8 2002



Originator (print) R. Seale	SPDMS ID T08011	Phone 1-3348	Organization ETM	Date 1/10/02	<input checked="" type="checkbox"/> Perm <input type="checkbox"/> Term <input type="checkbox"/> Temp-Recycle
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